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chip in a form of hybrid is reported in the JP 11(1999)-144307A (a third prior art) and JP11 (1999)-149652 A (a fourth prior art).--

REMARKS

The above preliminary amendment is made to correct a typographical error in the specification. A marked-up copy of the specification is attached.

Applicants respectfully request that the preliminary amendment described herein be entered into the record prior to calculation of the filing fee and prior to examination and consideration of the above-identified application.

If a telephone conference would be helpful in resolving any issues concerning this communication, please contact Applicants' primary attorney-of record, Douglas P. Mueller (Reg. No. 30,300), at (612) 371.5237.

Respectfully submitted,

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semiconductor laser chip in a form of hybrid is reported in the JP 11(1999)-144307A (a third prior art) and JP11 (1999)-147652 A (a fourth prior art). " " -- JP 11(1999) - 149052A --

However, each conventional pick-up has the following disadvantages. The monolithic semiconductor laser array integrated on the substrate according to the first prior art uses GaAs having an energy gap that is equal to or smaller than the energy gap (band gap) of the active layers both on the red laser and the infrared laser as a current block layer (narrow layer) for injecting electric current efficiently. Thus, the semiconductor according to the first prior art employs a complex refractive index waveguide structure confining the generated light beams in a stripe-shaped region effectively by absorbing laser beams emitted from the active layers. However, in the semiconductor laser element using the complex refractive index waveguide structure, the generated light beams are absorbed by the current block layer including GaAs. Therefore, it is extremely difficult to obtain a self-sustianed pulsation property or a high temperature high output property necessary for the information recording and reproducing apparatus.

Furthermore, since the semiconductor laser array according to the second prior art has a so-called gain waveguide structure without a current block layer, optical absorption by the current block layer does not occur. However, since the gain waveguide structure semiconductor laser element does not have an index waveguide structure for effectively confining the generated light beams, in order to realize a low noise that is necessary for an information recording and reproducing apparatus, it is necessary to have a means for suppressing the interference by, for example, making the oscillation spectrum to be a multimode.

However, even if the oscillation spectrum is made to be a multimode, the half value width of each spectrum is narrow, which easily causes the interference between the emitted light beams and the returned light beams. Consequently, it is not possible to lower the relative noise intensity (RIN) to be -130 dB/Hz or less. Therefore, the semiconductor laser array having a gain waveguide structure according to the second prior art needs a means for lowering the RIN by the use of a 1/4 λ plate (wherein λ denotes a wavelength of the laser beam emitted from the semiconductor laser element) and the like, which makes it difficult to reduce the number of the components constituting the optical pick-up. In order to solve such problems, it is necessary and essential to provide a semiconductor laser array with a self-sustianed pulsation property.